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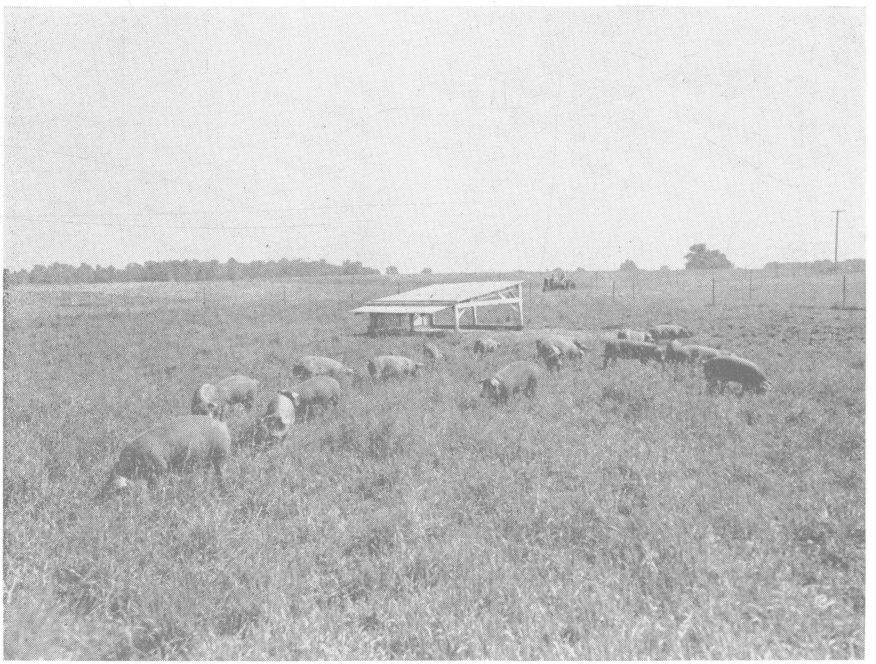
MAN LABOR on the Commercial Hog Enterprise

R. A. BAILEY and J. H. SITTERLEY



OHIO AGRICULTURAL EXPERIMENT STATION - - - WOOSTER, OHIO

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R. A. BAILEY and J. H. SITTERLEY

INTRODUCTION

Scope and Method. This circular deals with only one aspect of commercial hog production, the man labor input. It is based upon data obtained in a farm management study of the hog enterprise in the commercial hog producing area of central and southcentral Ohio. Information on other aspects of the hog enterprise, including the feed and capital inputs and cost of production, will be reported in a later publication.

The data included herein are not intended to be representative of, or to be used as standards for, all hog enterprises. The information was collected from a selected group of 25 farms, ranging in size from 80 to 400 acres. On all of the farms the hogs were a major, but not the only, livestock enterprise. While hogs were an important source of farm income in all cases, they were part of a diversified livestock program which included either one or two of the other livestock enterprises commonly found in Ohio. Dairy, beef breeding herds, feeder cattle and laying flocks were all represented as the second enterprise in the group. The two-litter system was used on all farms. Good quality clean range was provided in season, reasonable standards of cleanliness and sanitation were maintained, protein supplements were included in rations and in most cases the pigs were treated for cholera.

The information upon which this circular is based was obtained for the spring and fall litters of 1953. The farms were selected and the farmers provided with hog enterprise record books in the fall of 1952. Records of all labor, feed, expenses and receipts for the 1953 spring litter were started at that time and were continued through marketing of the 1953 fall litter. During that time each farmer was visited from three to five times to assist him with his records and to collect supplemental information. All of the information on the labor input was obtained through the cooperation of these farmers in regularly recording all time spent on the hog enterprise.

Farms Classified by Size of Enterprise. Labor efficiency in livestock production is related among other factors to size of enterprise. Generally speaking, the amount of labor required per unit of livestock product decreases as the size of enterprise increases. For this reason the information on the labor input is presented for small, medium and large hog enterprises. This classification is based on the average number of sows kept to be bred for the two litters. Measures of the average size of enterprise in the various classes are as follows:

	Small	Medium	Large	All 25
Number of farms	9	9	7	25
Average number of sows kept to be bred per litter	8.9	16.3	23.0	15.5
Average number of sows farrowed per litter	8.3	15.2	21.6	14.5
Percent of sows kept to be bred that farrowed	93.2	92.9	93.8	93.3
Hundred pounds of pork produced: Average per farm per year	250	486	618	438

TOTAL TIME SPENT ON THE HOG ENTERPRISE

While data on the labor input will be presented in detail for segments of the enterprise later, a general measure of the total time spent may be valuable in planning or budgeting approximate labor needs. One such measure was obtained by dividing all the hours spent in one year on the entire enterprise by the average number of sows farrowing two litters of pigs.

TABLE 1.—Man Hours per Sow per Year to Maintain Breeding Herd and to Produce and Market Two Litters of Fat Hogs, by Litter and by Size of Herd

Litter	Small	Medium	Large
	(8.3 Sows)	(15.1 Sows)	(21.6 Sows)
Spring	25.4	20.0	14.6
Fall	27.2	19.9	13.5
Both	52.6	39.9	28.1

The data above are expressed in terms of labor per sow farrowed. The annual labor input for a 15 sow herd, for example, is approximately 15 sows times 40 hours, or 600 man hours. On the farms studied an average of 93 percent of the sows kept to be bred farrowed. Hence, the labor per sow farrowed should be reduced by 7½ percent to obtain the total labor input per sow kept to be bred.

Since the time spent per sow decreases as the size of enterprise increases, an estimate of the relationship between size of herd and labor per sow is useful in determining the labor input for enterprises where the herd sizes fall somewhere between the average sizes shown in Table 1. This relationship is shown in Figure 1, where the estimated total hours spent per sow per year for any size of herd between 4 and 25 sows is calculated through the use of a second degree estimating equation.[1] On this chart each of the small crosses indicates the time spent per sow per year on an individual farm. The estimated time is shown by the line. An estimate of the labor input per sow for any size of herd within these limits may be read directly from the line or may be calculated from the formula in Footnote 1.

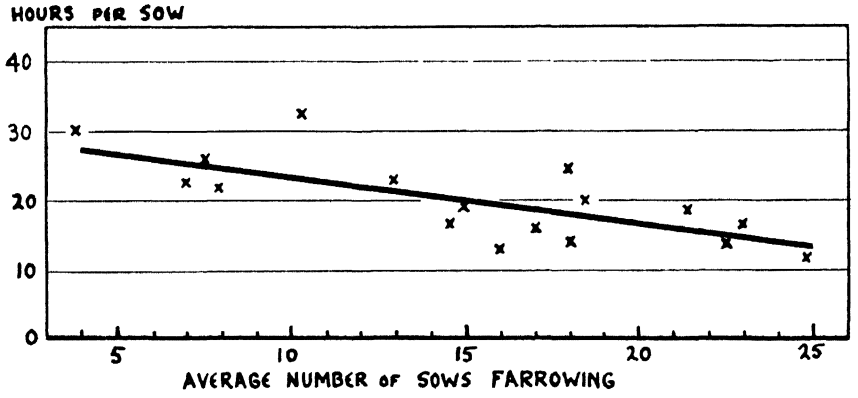

Fig. 1.—Man hours per sow per year to maintain breeding herd and produce two litters of market hogs, by size of farrowing herd.

Although the estimation line above shows a definite downward trend in time spent per sow as herd size increases to 25 sows, this trend cannot be projected to larger herds. In all probability, the major part of the possible efficiencies of larger scale of enterprise have been realized when the herd reaches 25 sows in size. Some additional reduction in labor per sow might be achieved with larger herds but the downward trend will certainly level off.

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[1] $Yc = 66.39 - 1.729\ X + .001215\ X^2$, where Yc is the calculated number of hours required per sow per year and X is the number of sows in the farrowing herd. The standard error of estimate (Sy) is 10.90 hours per sow per year.

It should be emphasized that these data on the total labor input per sow per year for the entire hog enterprise are general in nature and should be used only in determining approximate labor requirements. On farms which differ from those in this study in number of pigs weaned and marketed, more accurate labor determinations can be made by calculating labor for the fattening herd separately from other segments of the enterprise. The necessary information for such separate calculations is presented later in this publication.

TIME SPENT ON DIFFERENT SEGMENTS OF THE HOG ENTERPRISE

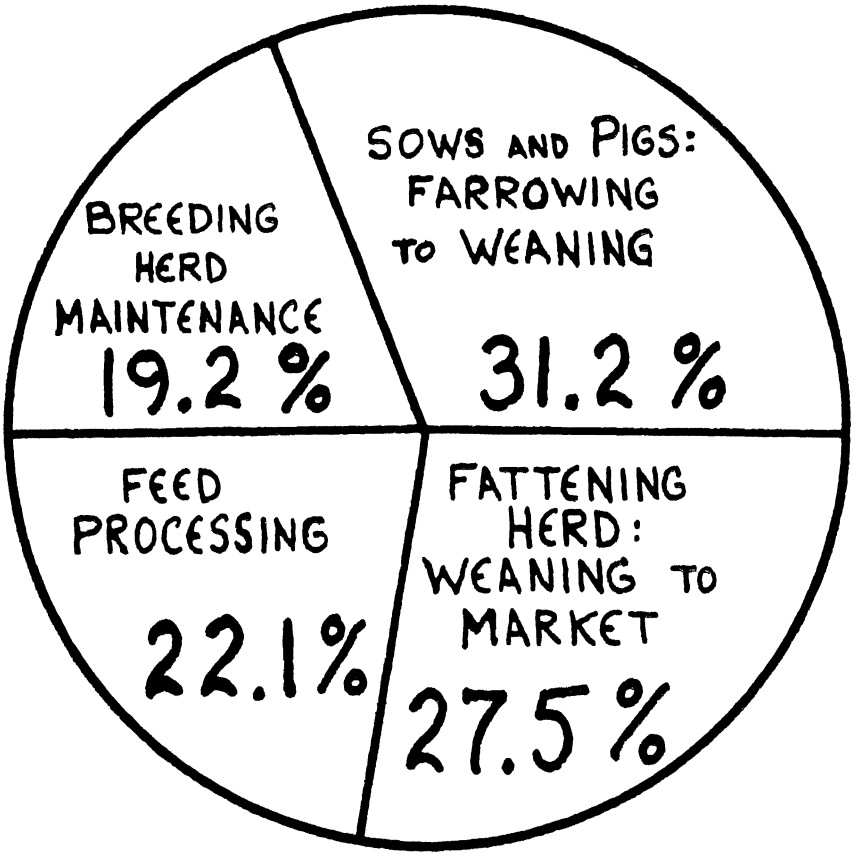
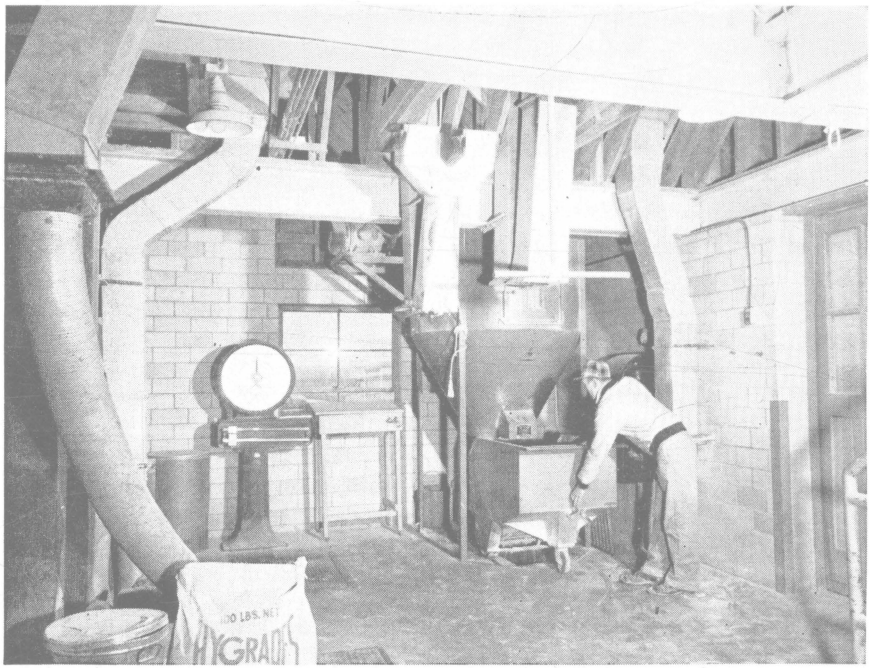


Fig. 2.—Percentage of total labor on hogs spent on segments of the enterprise.



Feed is mixed at the feeding center in this hog enterprise. Several feed processing practices are followed by commercial feeds which vary from shelling and grinding on the farm to having it done in commercial mills.

Feed Processing. This segment of the enterprise includes the time spent on all handling and processing of feed for the entire enterprise, but does not include the time spent on the actual feeding operation. Time spent on feeding is included under other segments of the enterprise.

Many different processing practices were followed on the farms studied. On some farms ear corn, requiring no processing, was fed. On other farms shelled corn was fed, with the shelling being done on the farm in some cases; at commercial feed mills in others. On still other farms the corn was fed as ground shelled corn in mixture with other feeds. Shelling, grinding and mixing was done on the farm in some cases; at commercial mills in others. Sometimes the corn was hauled to the mill by the farmer; sometimes hauling was done by the mill or elevator. On several farms a variety of practices were followed, with corn fed in two or more forms.

The most common single processing system, used on eight of the farms, was one in which ground shelled corn was mixed with supplement feeds, with the shelling, grinding and mixing done at a commercial feed mill and with the farmer doing his own hauling to and from the mill. About one-half of the corn fed to the breeding herd on these farms was ear corn. The time spent on processing feed on the eight farms using this common set of practices was determined and the labor per unit of feed processed was calculated for various sizes of enterprises. These rates were used to calculate the feed processing labor for the entire group of 25 farms, thus standardizing feed processing practices to those most commonly used.

After standardizing processing practices it was found that on the average farm studied feed processing accounted for 16 minutes per 100 pounds of pork produced, or 22.1 percent of the total labor input. Similar to labor requirements generally, the time spent on processing per 100 pounds of pork produced was less on large enterprises than on small.

TABLE 2.—Time Spent on Feed Processing per 100 Pounds of Pork Produced

	Small	Medium	Large
Feed processing labor per 100 pounds of pork produced (minutes)	22 2	16 2	14 4
Annual pork production per farm (100 pounds)	250	486	618

Breeding Herd Maintenance and Care of Sows and Pigs from Farrowing to Weaning. These two segments of the enterprise include all of the labor involved in maintaining a breeding herd and producing two litters of pigs per year to weaning, except for feed processing. Combined, on the average farm studied, they accounted for half of the time spent on the swine enterprise. To maintain one sow for a year and produce two litters of pigs ready to wean and enter the fattening herd took 20.4 hours on the average farm. Less time per sow was spent on larger herds more on small, as shown in Table 3.

Six-tenths of an hour more time per sow was spent on the average farm to maintain the breeding herd and produce weanling pigs in the spring litter than in the fall. This is largely the result of low breeding herd labor requirements for the fall litter. Typically, the sows were turned on high-quality range in the spring, at or immediately after

breeding for the fall litter, and remained there until fall farrowing time. Water was available without hauling in many cases and the amount of feed consumed in addition to forage was relatively small. Very little time was spent on their care.

The annual labor input per sow to maintain the breeding herd and produce two litters of pigs to weaning is shown for three sizes of herd on the bottom line of Table 3. Estimates of the labor input for all sizes of herd from 4 to 25 sows are shown by the line in Figure 3.[2]

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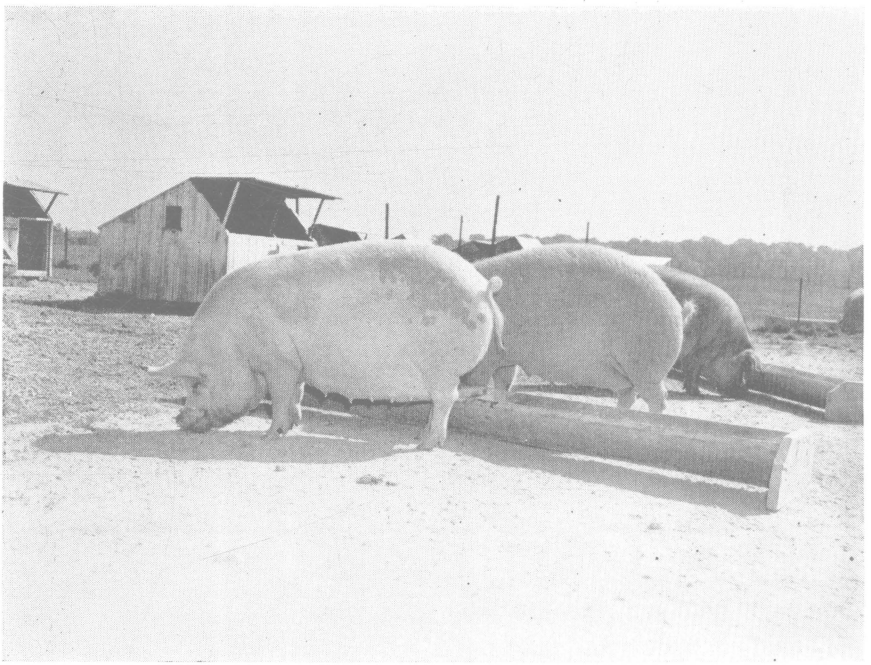
[2]Linear estimating equation used: Yc = 31.86 — .77X, where Yc is the calculated numbers of hours per sow per year and X is the number of sows in the farrowing herd. Linear equation used since there was no significant difference between results of linear ad second degree equations.



Care of the sows is one of the big segments of time spent with the herd. More time is spent with the spring litter than the fall pig crop.

TABLE 3.—Man Labor to Maintain Breeding Herd and Produce Pigs to Weaning: Hours per Sow Farrowing

		Small	Medium	Large	All Sizes
Number of farms studied		9	9	7	25
Average number of sows farrowing:					
Spring		8.9	15.4	21.0	14.6
Fall		7.8	14.9	22.1	14.4
Year		8.3	15.2	21.6	14.5
Average hours per sow farrowing:					
Spring:	Breeding herd	5.5	4.2	3.3	4.3
	Sows and pigs	7.8	6.2	4.4	6.2
	Total	13.3	10.4	7.7	10.5
Fall:	Breeding herd	5 3	3.3	2.1	3.5
	Sows and pigs	7.3	7.0	4.6	6.4
	Total	12.6	10.3	6.7	9.9
Both Litters:	Breeding herd	10 8	7.5	5.4	7.8
	Sows and pigs	15.1	13.2	9.0	12.6
	Total	25 9	20.7	14.4	20.4

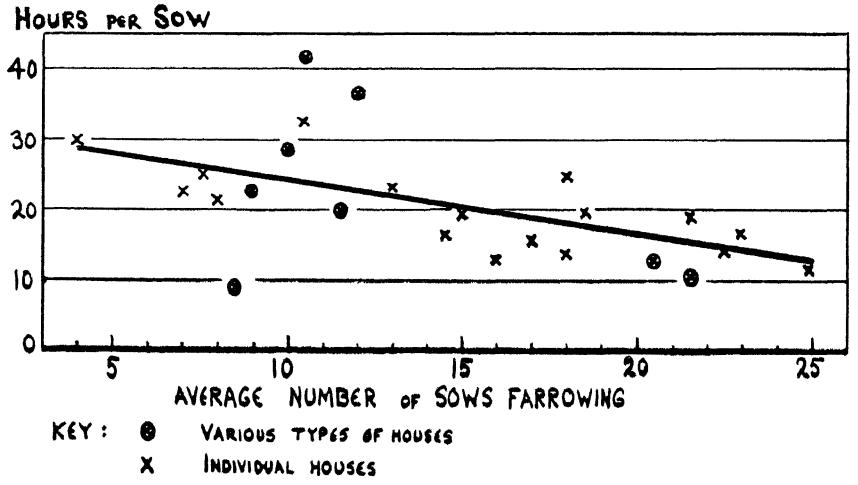


Fig. 3.—Hours per year per sow in farrowing herd to maintain breeding herd and produce two litters of pigs to weaning when various types of housing were used at farrowing.

On the 25 farms from which the data shown in Table 3 and Figure 3 were obtained various types of housing were used at farrowing. On 17 of the farms individual houses were used for the farrowing of both spring and fall litters. On the other eight farms, 4 to 6 sow houses, barns or central houses were used. The extreme variations about the estimation line in Figure 3 are for farms in the miscellaneous housing group.

When the time spent on the breeding herd and pigs to weaning on the 17 farms using individual housing were analyzed, the average time spent per sow farrowing was found to be almost identical with the average time spent per sow on the entire group of farms.

	Spring	Fall	Both Litters
All 25 farms: Various types of housing	10.5	9.9	20.4
17 farms: Individual houses only	10.5	9.7	20.2

The calculated estimate[3] of the relationship between size of farrowing herd and the labor input per sow is shown for the 17 individually-housed herds by the estimating line in Figure 4. When this chart is compared with Figure 3 it is seen that the estimating lines are very similar, indicating little difference between the two groups of farms in estimates of the labor input per sow for different sizes of enterprise.

[3]Linear estimating equation used: $Yc = 30.06 - .6726\ X$, where Yc is the calculated hours per sow per year and X is the number of sows in the farrowing herd.

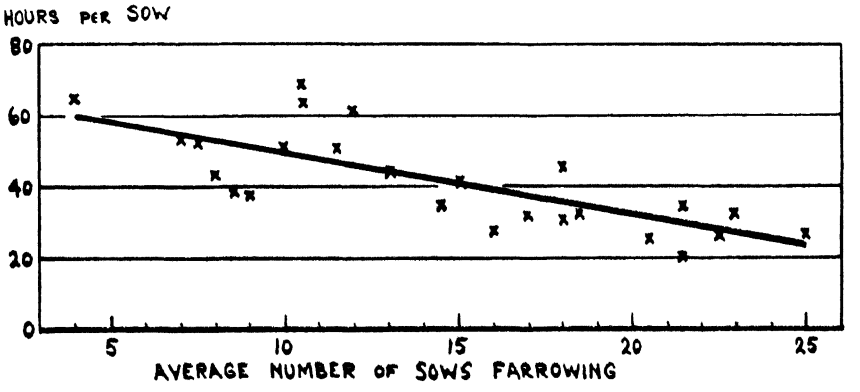


Fig. 4.—Hours per year per sow in farrowing herd to maintain breeding herd and produce two litters of pigs to weaning when individual houses were used at farrowing.

It should be noted, however, that the 17 herds, shown by small crosses in Figures 3 and 4, in the group of individually housed herds are concentrated much more closely about the estimating line than are the herds in which several different types of housing are used. Adding the results of statistical tests[4] to this observation, it is apparent that these data on the labor involved in breeding herd maintenance and care of sows and pigs from farrowing to weaning would be more reliable in estimating the labor input for enterprises where individual housing at farrowing is used for both litters than for farms where other types of housing are used. With other types of housing there are apparently opportunities for increasing labor efficiency at farrowing time and during the suckling period beyond the estimates given here. By the same token there is the possibility of more time per sow being required in this segment of the enterprise, particularly on smaller enterprises.

Care of Fattening Herd, Weaning to Market. All of the labor, except feed processing, involved in the care of the fattening herd from the time the pigs were weaned until the hogs were marketed is included in this segment of the enterprise.

On the average farm studied, a total of 207 pigs were weaned in the two litters; 105 in the spring; 102 in the fall, and were started in the summer and winter fattening herds. Of the 207 pigs started, four were sold or given to children as feeder pigs. Four died, one was butchered,[5] five were saved for breeding and 193 were sold as fat hogs. The fat hogs weighed an average of 211 pounds when marketed. The average weight of the 203 hogs produced was 209 pounds.

Between weaning and market, an average of 50 minutes time was spent on each of the 203 hogs produced, not including time spent on feed processing. This is equal to 24 minutes or four-tenths of an hour for each 100 pounds of pork produced. It should be noted that the weight of pork produced does not refer to net production or weight added while the hogs were in the fattening herd, but rather to gross weight at the time the hogs were marketed, butchered or taken from the fattening herd as gilts for the breeding herd. Weight of the weaned pigs at the time they were placed in the fattening herd was not deducted.

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[4]Coefficient of determination (r^2): individual houses, .5159; all houses, .3030; standard error of estimate (S_y); individual houses, 3.91 hours; all houses, 6.71 hours.

[5]Actually more than one: An average of 1.24 hogs were butchered per farm.

The average labor input per 100 pounds of pork produced is shown for the three sizes of enterprises and for the summer and winter fattening herds in Table 4. As was the case with other segments of the enterprise, labor efficiency was higher on large herds than on small. In fact, as is shown in the last column of Table 4, less than one-half as much time per unit of pork output was spent on the group of large farms as on the small.

TABLE 4.—Time Spent on Fattening Herd per 100 Pounds of Pork Produced, Averages for Different Sizes of Summer and Winter Herds

Size of herd	Number of farms	Hundred pounds of pork produced per herd			Hours of man labor per hundred pounds of pork produced		
		Summer	Winter	Both	Summer	Winter	Average, summer and winter
Small	9	117	123	240	55	55	55
Medium	9	229	241	470	38	35	.37
Large	7	312	288	560	23	29	.25
All sizes	25	212	212	424	40	41	40

The estimated time spent in caring for the fattening herd per 100 pounds of pork produced is shown for enterprises in which fattening herd pork output ranges from 12,000 to 80,000 pounds per year, or from approximately 55 to 380 fat hogs, in Figure 5. The estimated labor input for any size of herd within these limits may be read directly from the estimating line in this chart or may be calculated from the formula in Footnote on page 5.

Relationship Between the Form in Which Corn is Fed and the Labor Input to the Fattening Herd. The form in which corn was fed varied among the 25 farms and on the individual farms as well. In classifying the farms on this basis, 14 of the 25 were placed in a miscellaneous group because more than one form of corn was fed to each of the fattening herds in the group. Some herds were started on ground shelled corn in mixture with supplement, and later switched to shelled or ear corn or both. On other farms the summer herd was fed one form of corn; the winter herd another. Some ear corn was fed from self-feeding cribs; other ear corn was hand fed. On several of the farms

some new ear corn was fed in the fall of the year. Several of the 14 farms fed the corn in the form that was most convenient at the time. A man feeding ground shelled corn, for example, sometimes found it inconvenient to make a trip to the mill, and switched temporarily to ear corn.

On the other 11 farms, 95 percent or more of the corn fed to both summer and winter fattening herds was fed in self-feeders as ground shelled corn in mixture with other feed. This group was compared with the entire group and with the group of 14 in which corn was fed in miscellaneous forms to determine whether there were differences in the groups in the time spent per unit of pork produced. Differences in the average time spent were negligible, as were differences between the groups in estimates of the labor input for various sizes of herd as calculated statistically.

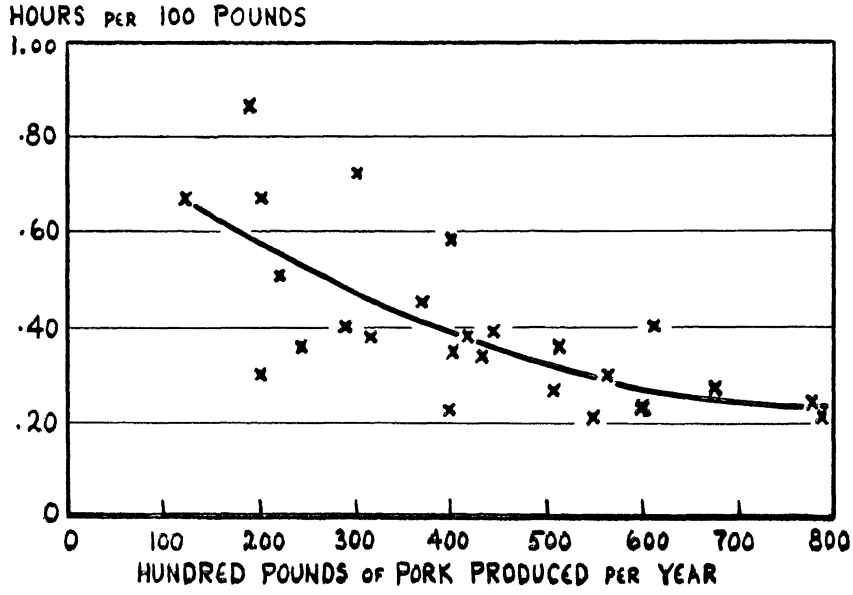

Fig. 5.—Man labor to care for fattening herd, average of summer and winter herds, hours per 100 pounds of pork produced.[6]

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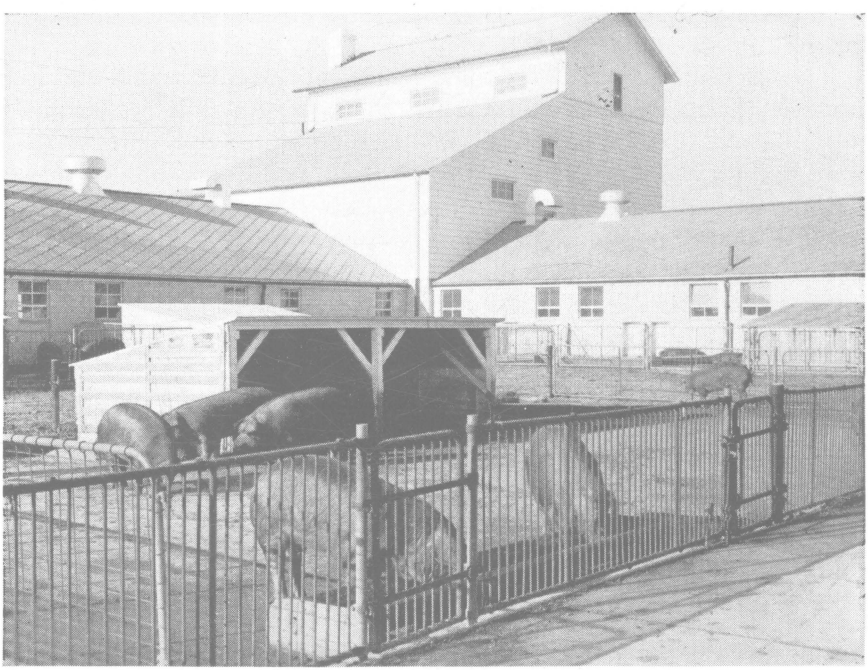
[6]Estimation line based on second degree estimating equation: $Yc = .8325 - .1473X + .00912X^2$, where Yc is the calculated hours per 100 pounds of pork and X is the weight of pork produced per year, in 100 pounds.

Coefficient of determination (p^2) = 48 11 percent; Standard error of estimate (S_y) — .12365 hours.

While differences in the form in which corn was fed were not found to be related to labor efficiency in caring for the fattening herd, it should be remembered that the time spent on feed processing was considered separately and was not included in these comparisons. Any differences in processing labor for the different forms of corn would affect the total labor input to the hog enterprise.

Summer vs. Winter Fattening Herds. In the group of 25 farms studied the summer and winter fattening herds differed in the management practices followed and in the types of jobs involved in their care.

On all of the farms the summer herd was carried on pasture; typically high quality rotation pasture. Various numbers of pasture fields were used; some located close to the farmstead and others up to a mile away. Water was available from wells in some fields, was piped to some fields and had to be hauled to others. On most farms more than one method was used in getting water to the hogs as they were moved from field to field. Fence had to be maintained and shade had to be provided in some fields.



The summer herd is usually carried on pasture while the winter herd is housed as shown here in a central feeding section.

By the time most of the fall litter pigs were weaned and placed in the winter fattening herd the pasture season had ended. As a result, very little of the time spent on the winter fattening herd was while the herd was on pasture. In most cases the winter herd was housed in a central feeding house or section of a barn. On a few farms, smaller houses were grouped around a feeding floor or platform, but in all cases housing was located close to feed storage and water was generally available without hauling.

In spite of the differences in summer and winter management there was no significant difference between the two fattening herds in the time spent per 100 pounds of pork produced. As shown in Table 4 on page 13, .40 and .41 hours per 100 pounds of pork were spent on the summer and winter herds, respectively, on the average farm. The differences between the summer and winter herds in each of the size classes, as shown in the same table, become very slight when adjustment is made for differences in the average size of the two herds.

While the summer and winter herds were similar in the average time spent on their care, the variation in labor efficiency between individual enterprises of equal size was greater for the summer herd. This would be expected in view of the wider variety of management practices followed in the summer.

Some farmers had very conveniently arranged facilities for the summer herd. Pastures were close to the farmstead, with water piped to the fields. Feed storage was close to the pasture and work routines were well organized. The time spent per unit of pork produced was considerably less than average on these farms.

Other farmers whose pasture, watering and feeding facilities were at the opposite extreme and whose work routines were not so well organized spent more than the average time in caring for the summer fattening herd. Five farmers, for example, spent from 10 to 20 minutes more time per 100 pounds of pork produced than was spent by the average farmer with herds of similar size.

On the basis of this variation it is suggested that the average time spent on the summer herd, shown in Table 4, might be increased by as much as .25 hours per 100 pounds of pork produced in calculating the labor input for enterprises where facilities for managing the fattening herd are inadequate or poorly arranged. The averages might be reduced by as much as .12 hours per 100 pounds for enterprises with very good facilities for summer management of the fattening herd. It should be remembered, however, that the average figures in this publication were obtained from a selected group of farmers who, as a group, were probably of higher than average efficiency in their utilization of labor.

Less variation between enterprises of equal size was found in labor efficiency on the winter fattening herds. The average time spent on this herd might also be adjusted to better fit variations in facilities, but the adjustments should be less than for the summer herd.

Monthly Distribution of Man Labor. The farrowing date is probably the most important single factor affecting the distribution of man labor on the hog enterprise. On the farms studied the average farrowing date for the spring litter was February 20, with some herds farrowing earlier and some later. In calculating the monthly distribution of the labor input, data for the individual farms were shifted to center the spring farrowing period on this date. With the enterprises standardized in this way the percentage of the total time that was spent in each month on the average farm is as shown in Figure 6.

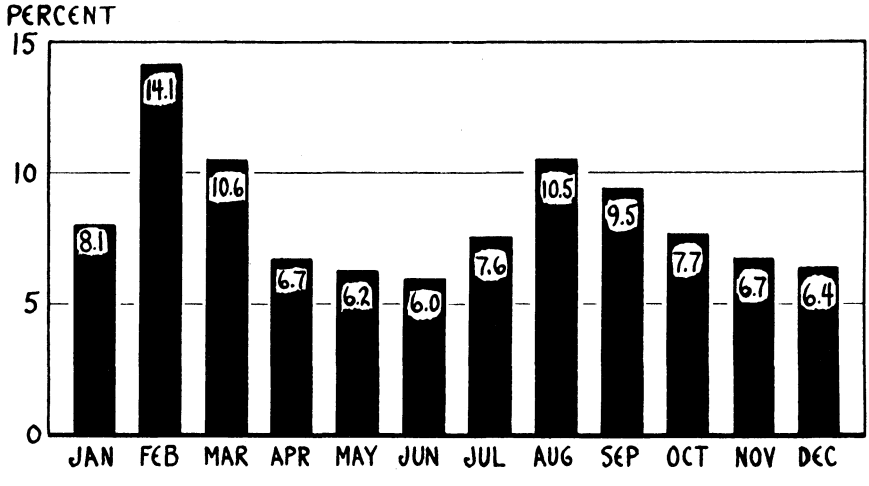


Fig. 6.—Percentage distribution by months of the total annual labor on the hog enterprise. (Average of 25 farms).

The distribution of labor requirements for a hog enterprise on an individual farm may be different than that shown in Figure 6. While the spring litter farrowing dates were standardized in this study this did not result in perfect standardization of the fall farrowing date. Consequently the August labor peak would probably be a little higher for herds farrowing at this time than the 10.5 percent indicated. July and September are probably a little lower.

On individual farms there is also the possibility of the two litters overlapping and causing high peaks in the labor requirement. Spring litter farrowing for example, may be extended over a period of two months or more. On the same farm the feeding period for the summer fattening herd may be extended to permit the utilization of larger amounts of forage. The result is that the summer fattening herd is still on the farm when the fall litter pigs are farrowed. Two segments of the enterprise, each requiring large amounts of labor, overlap. The combined peak is particularly hard to manage when it falls at a time of high seasonal labor requirements by other parts of the farm operation.

SUMMARY

For hog enterprises where the two litter system of management was used; where most of the farrowing was in individual houses; where rotation pasture was used in the summer; where corn was hauled by the farmer to a commercial mill for shelling and grinding and was fed in self feeders, and where reasonable standards of sanitation were maintained, the following points can be made about the man labor involved in the enterprise:

1. There was a definite relationship between size of enterprise and labor efficiency in all segments of the hog enterprise. The time spent per sow per year in doing all the work on the enterprise was nearly twice as great in 8 sow herds as in 22 sow herds.

2. In maintaining the breeding herd and producing two litters of pigs to weaning the following time was spent per sow farrowing—

Small herds	(8 3 sows)	25 9 hours
Medium herds	(15 1 sows)	20 7 hours
Large herds	(21.6 sows)	14.4 hours

3. In caring for the fattening herd from weaning to market the following time was spent per 100 pounds of pork sold, butchered or saved for breeding stock:

Small herds	.55 hours
Medium herds	.37 hours
Large herds	.25 hours

4. Processing feed took 22 percent of the total time spent on the enterprise. With processing considered separately the percentage of the total time spent on each segment of the enterprise was:

Breeding herd maintenance	19 percent
Care of sows and pigs from farrowing to weaning	31 percent
Care of fattening herd from weaning to marketing	28 percent